PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent appln. of :	Keith C. Hong, et al.
Appln. No:	10/600,809
Filed:	June 20, 2003
For:	**ALGAE RESISTANT ROOFING GRANULES WITH CONTROLLED ALGAECIDE LEACHING RATES ALGAE RESISTANT SHINGLES, AND PROCESS FOR PRODUCING SAME**
Group Art Unit:	1762
Examiner:	Elena Tsoy
Confirm. No.:	9261
Docket No:	183-01

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

This appeal brief is being submitted electronically on December 12, 2007 in support of the Notice of Appeal filed electronically on October 12, 2007.

I. Real Party in Interest

The real party in interest is CertainTeed Corporation, a Delaware corporation.

II. Related Appeals and Interferences

There are no related appeals or interferences, other than the appeal currently pending in Application No. 10/600,847, which discloses a different process for producing algae-resistant roofing granules.

III. Status of the Claims

Claims 4, 5, 7-14 and 39-50 have been finally rejected.

Claims 19-38 have been withdrawn as drawn to a non-elected invention.

The claims on appeal are claims 4, 5, 7-14 and 39-50.

IV. Status of Amendments

There were no amendments filed subsequent to final rejection.

V. Summary of the Claimed Subject Matter

How can roofs be protected against algae growth over a long service life?

In the roofing industry, rock is crushed to a predetermined size, 0.1 micrometer to 40 micrometer (specification, page 5, lines 27-28) for use in preparing the mineral granules that cover the asphalt shingles that cover residential roofs in many parts of our country. The granules are the structure's first line of defense against the elements. Typically, the granules are covered with a thin, highly durable colored ceramic coating, which enhances the appearance of the roof. Significant quantities of stone dust (less than 0.1 micrometer), are generated by this process. The present invention turns this liability into an asset.

In some parts of this country environmental conditions favor the growth of algae on roofs. The algae growth can substantially detract from the appearance. Typically, algae growth is discouraged by incorporating a biocide into the ceramic coating on the granules. The biocide slowly leaches out of the coating. However, it is difficult to control leaching from a thin coating, and the available biocide may dwindle to an ineffective level long before the anticipated life of the roof.

The present invention addresses the problem by making use of stone dust to form agglomerates that incorporate biocide.

In particular, as embodied in independent claim 39, the presently claimed invention relates to a process for producing algae-resistant roofing granules (Figs. 1-4; page 9, line 10 - page 10, line 2). The process includes preparing (page 6, lines 22-31) porous, inert base particles from a mixture of stone dust (page 5, lines 26 - 31) and a binder (page 6, lines 3 - 8). The process also includes providing at least one inorganic algaecide (page 7, lines 10-15) on (Figure 1) or within (Figures 2 and 3). The process also includes insolubilizing the binder (page 6, lines 9 - 11; page 7, lines 7 - 9).

As embodied in independent claim 44, the presently claimed invention relates to a process for producing algae-resistant roofing granules (Figs. 1-4; page 9, line 10 - page 10, line 2). The process includes preparing (page 6, lines 22-31) porous, inert base particles from a mixture including stone dust (page 5, lines 26 - 31) and from about 10 percent to 40 percent by weight of a binder comprising an aluminosilicate material (page 6, lines 3 - 8). The process also includes providing at least one inorganic algaecide (page 7, lines 10 - 15) within the base particles to form algaecide-bearing particles. The process further includes insolubilizing the binder by firing the base particles in a kiln at a temperature of at least of from 800 degrees C to 1200 degrees C (page 6, lines 9 - 11). The resulting roofing granules have a porosity of between 3 percent and 30 percent by volume (page 3, lines 9 - 10).

VI. Grounds of Rejection To Be Reviewed On Appeal

A. Claims 4-5, 7-8, 13, 14 and 39-45 were rejected as being unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 6,214,466 (“Joedicke”) or U.S. Patent 3,528,842 (“Skadulis”) or U.S. Patent 3,507,676 (“McMahon”) in view of Japanese Patent Publication 2002-018358 (“Ine et al.”) and further in view of U.S. Patent 5,022,897 ("Balcar et al.").

B. Claim 9-12 were rejected as unpatentable under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,214,466 ("Joedicke") or U.S. Patent 3,528,842 ("Skadulis") or U.S. Patent 3,507,676 ("McMahon") in view of U.S. Patent 5,022,897 ("Balcar et al.") and further in view of U.S. Patent 6,306,795 ("Ryan et al.").

C. Claims 46-50 were rejected as being unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 6,214,466 ("Joedicke") or U.S. Patent 3,528,842 ("Skadulis") or U.S. Patent 3,507,676 ("McMahon") in view of Japanese Patent Publication 2002-018358 ("Ine et al.") and further in view of U.S. Patent 5,022,897 ("Balcar et al.") and still further in view of U.S. Patent 4,735,975 ("Iwata").

VII. Argument

A. The Cited Combination of References Is Improper and Cannot Render Claims 4-5, 7-8, 13, 14 and 39-45 Obvious

1. The Secondary References Are Non-analogous Art

In making her final rejection, the Examiner reconstructs applicants' invention by agglomerating references from three different, unrelated arts. Since the two secondary references the Examiner relies upon are neither in the same field of endeavor (producing roofing granules) nor reasonably pertinent to the problem of providing long tem algae resistance, her rejection is not based on the relevant prior art, and she has not made a prima facie case of obviousness. The Board should reverse her rejection for this reason.

Joedicke, Skadulis and McMahon all relate to manufacture of roofing granules, and in particular. Ine et al. relates to the art of road construction. Balcar relates to the disposal of hazardous waste. Applicants respectfully submit that one of ordinary skill in the roofing granule art would not look to the road construction or hazardous waste disposal arts to solve the problem of long term algae resistance.

A prerequisite to determining whether a claimed invention would have been obvious to one of ordinary skill in the art in view of the art cited by the Examiner is

determining what is "prior art, an issue frequently couched in terms of whether the cited art is “analogous” or too remote to be treated as prior art. In re Clay, 966 F.2d 656, 657, 23 USPQ2d 1058 (Fed. Cir. 1992), citing In re Sovish, 759 F.2d 738, 741, 226 USPQ 771, 773 (Fed. Cir. 1985).

Two criteria can be applied to determine whether cited art is analogous. The first criterion is whether the cited art is from the same field of endeavor, regardless of the problem being addressed by the inventor. The second criterion is whether the reference is still reasonably pertinent to the particular problem being solved by the inventor, assuming the reference is not in the same field of endeavor. In re Clay, 966 F.2d 656, 658-59 (Fed. Cir. 1992), citing In re Deminski, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); In re Wood, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979); In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2d 1443 (Fed. Cir. 1992). In the Oetiker case, the applicant claimed an improvement in a hose clamp which differed from the prior art in the presence of a pre-assembly "hook" which maintained the pre-assembly condition of the clamp and disengaged automatically when the clamp was tightened. The Board had relied upon a reference which disclosed a hook and eye fastener for use in garments, reasoning that all hooking problems are analogous. The Federal Circuit held the reference was not within the field of applicant's endeavor, and was not reasonably pertinent to the particular problem with which the inventor was concerned because it had not been shown that a person of ordinary skill, seeking to solve a problem of fastening a hose clamp, would reasonably be expected or motivated to look to fasteners for garments. Here there is no showing why one of ordinary skill in the roofing granule art would look to either the hazardous waste disposal art of Balcar et al. or the art of preparing sub base materials for road construction to which the Ine et al. reference pertains.

2. The Secondary References Relate to Different Fields of Endeavor

The present invention and the three equivalent primary references all relate to the same general field of endeavor - protective granules for roofing.

As stated in the "field of the invention" section of the application on appeal, "[t]he present invention relates to asphalt roofing shingles, protective granules for such shingles, and process for making such granules and shingles" (page 1, line 10-11).

Similarly, as stated in the "field of invention" section Joedicke "relates to algae-resistant roofing granules. More particularly, it relates to algae-resistant roofing granules of the type which are artificially colored and contain a slow-release bimetallic algicide as a component of the color coating."

In the same vein, Skadulis et al. states that "[t]his invention relates to inorganic coatings for outdoor surfacing having algcidal and/or fungicidal properties, to articles such as roofing granules coated therewith, and to methods for protecting surfaces from the growth of algae thereon" (col. 1, lines 24-28).

McMahon "relates to outdoor surfacing and granules therefor which are resistant to the growth of algae and/or fungus thereon" (col. 1, lines 19-21).

In contrast, each of the two secondary relate to wholly different fields.

Balcar et al., in the field of invention section, states that "[t]his invention relates to hazardous waste removal, and more particularly to removal of hazardous waste from a flowing gaseous stream, as well as neutralization of the removed waste, and to a neutralized product containing same" (col. 1, lines 6-11). The nontoxic glass particulate resulting from Balcar et al.'s process can be used for roofing granules (col. 6, lines 16-17) as well as for many other applications.

Ine et al., in the field of invention section of the machine translation relied upon by the Examiner, states that "[t]his invention performs the wet process which washes a crushed stone at a quarry, a crushed stone place, or a sand production place, it adds

calcined lime, a petrifaction system stabilizer, etc. to the crushed stone impalpable powder (dewatering cake) collected from the waste-water-treatment process, carries out churning mixing, granulates, and it relates to the mixed selector of the crushed stone impalpable powder which secures stability while it raises the reinforcement" (paragraph [0001]). The calcined lime (calcium oxide) is added so that the granulated material can be used as "subgrade material" (paragraphs [0003], [0016]) for road construction.

One of ordinary skill in the art seeking to make algae resistant roofing granules would not look to the art of removing hazardous waste from gaseous streams for guidance. Nor would he or she look to the art of stabilizing materials for use in road construction.

3. The Secondary References Are Not Reasonably Pertinent To the Problem Solved by the Present Invention

Neither of the secondary references is reasonably pertinent to the problem solved by the present invention. Ine et al. discloses an apparatus for granulating stone powder using a lime stabilizer to prepare a material for constructing a road sub base. The present invention relates to making roofing granules which "provide durability, reflect heat and solar radiation, and protect the bituminous binder (of the roofing shingle) from environmental degradation" (specification, page 10, lines 12-15). Ine et al. is simply not reasonable pertinent. Ine et al.'s granulated stone dust is a temporary material. Lime is well known as a "non-hydraulic" cement - calcium hydroxide is not stable in water. If Ine et al.'s stone dust granules were to be used for roofing, they would disintegrate through exposure to moisture. When used as in constructing road base, Inge et al.'s stone dust granules would tend to lose their integrity when the sub base is compacted.

In explaining her rejection, the Examiner mischaracterizes applicants' disclosure as teaching a solution to "problem" of recycling stone dust (Examiner's Action of July 24, 2007, page 5, first paragraph). The Examiner confuses the solution with the problem.

Applicants' presently claimed invention is addressed to the "continuing need for algae-resistant roofing products having algaecide leaching rates that can be controlled so that the roofing products can be tailored for specific local conditions" (specification, page 2, lines 18-20).

Balcar et al. is even further removed from the problem solved by the present invention. Balcar et al. disclose an improved method of coating a filter bag in a flowing gas stream (col. 1, lines 60-62). Glass dust particles are combined with the flowing gaseous stream which contains hazardous waste material, and then trapped on the surface of a filter bag. The glass dust material helps trap hazardous waste particulates on the surface of the filter bag, and is periodically removed from the filter bag. The removed mixture of glass dust and hazardous waste particulate and may be mixed with additional glass dust and melted and cooled to form an neutralized amorphous glass (col. 2, lines 1-9). Additionally, sodium silicate or a similar material can be combined with the mixture of hazardous waste and glass particles (col. 5, lines 51-59). "During the melting procedure the leachable lead, cadmium oxide and other undesirable components are neutralized" (col. 2, lines 11-13). The resulting material can be comminuted to produce a particulate product (co. 2, lines 15-16) which can be used as roofing granules (col. 6, lines 13-16). The toxic materials leachable from the glass particulate are so low that they would meet current EPA standards for drinking water (col. 6, lines 12-13). In contrast, in the present invention the preferred inorganic algaecides slowly leach from the granules to provide algae resistance (specification, page 3, lines 14-17). Balcar et al.'s technique for rendering toxic materials harmless is not relevant to the problem of providing a material toxic to algae over a long period of time.

Thus, this rejection should be reversed because the Examiner relies upon non-analogous art.

B. The Cited Combination of References Do Not Make Out a *Prima Facie* Case of Obviousness with Respect to Claims 4-5, 7-8, 13, 14 and 39-45

Even were all the art relied upon by the Examiner analogous art, the combination fails to make a *prima facie* case of obviousness. In particular, the Examiner's rejection relies an inaccurate reading of Balcar et al. The Examiner's understanding is that sodium silicate is used as a *binder* for glass dust for use in roofing granules (Office Action of July 24, 2007, page 4, second full paragraph). It is not.

In Balcar et al.'s Example 2, sodium silicate powder is mixed with "D-dust" (waste soda lime glass powder) and "crusher dust" (high alumina glass dust) and the mixture is heated to drive off volatiles and then fused at 1200 degrees C for an hour, and cooled. Platinum crucibles could not withstand these extreme high temperature conditions, and alumina crucibles had to be used. When the mixture "fuses," the original dust particles melt into a continuous fluid mass. The resulting glass does not include a sodium silicate "binder," and if the resulting glass mass is comminuted to provide roofing granules, such granules would necessarily be solid glass granules. They would not include glass dust particles bound together by a sodium silicate binder, as the Examiner has suggested. If a commercial aqueous sodium silicate solution is substituted for the sodium silicate powder (col. 8, lines 28-39), the result would be the same. The mixture of sodium silicate dispersion and glass powder would be heated to drive off volatiles (e.g. the water) and the dried mixture would be fused and cooled. The sodium silicate would not function as a binder in the resulting glassy matrix.

If one of ordinary skill in the art combined the disclosures of the references cited by the Examiner in making this rejection, the presently claimed invention would not result. If sodium silicate were substituted for the lime binder used for stone dust by Ine et al., and a toxic material were added as taught by Balcar et al., the resulting granules would be fused to give a continuous mass (or at least a continuous glassy matrix in

which the stone dust particles were imbedded as a separate phase) and the mass would be comminuted to give a particulate, as taught be Balcar et al. The toxic material would be rendered harmless, and ineffective as an algaecide. There is nothing in this combination of references that would suggest to one of ordinary skill in the art that Balcar et al.'s express teaching that the glass particles be fused should be ignored. This must be gleaned from applicants' own disclosure, and thus by the Examiner own test (Examiner's Action date July 24, 2007, page 7, first full paragraph), the Examiner's rejection is simply an improper hindsight reconstruction of the claimed invention. In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Further, it is unclear how a refractory material like the stone dust could be fused in any conventional industrial process, as the combination would suggest. The Examiner has failed to make out a *prima facie* case of obviousness, and her rejection should be reversed for this reason as well.

C. The Examiner Improperly Relies Upon a Machine Translation of a Japanese Language Patent Disclosure

In making her rejection of claims 4-5, 7-8, 13, 14, and 39-45, the Examiner relies both upon the English language abstract of Japanese Patent Publication No. 2002-018358 and the machine translation thereof provided by the Japanese Patent Office (Examiner's Action of July 24, 2007, page 4, first full paragraph). The first page of the machine translation states that "[t]his document has been translated by computer. So the translation may not reflect the original precisely." This is understatement - the translation is nearly incomprehensible.

In contested matters, the Rules require that when a party relies upon a document in a foreign language, a translation into English and an affidavit attesting to the accuracy of the translation be filed with the document. 37 C.F.R. § 41.154(b). The same rule should obtain in *ex parte* appeals. In this case, the translation is accompanied by a

disclaimer of accuracy. No evidentiary weight should be given to this translation for this reason. The Examiner's rejection should be reversed for this reason as well.

D. The Cited Combination of References Is Improper and Cannot Render Claims 9-12 Obvious

As argued above, both Ine et al. and Balcar et al. are non-analogous art. The sixth reference that Examiner has added to try to reconstruct the applicants' invention as claimed in Claims 9-12, Ryan et al., is also non-analogous art.

First, Ryan et al. relates to a different field of endeavor. In particular, according to the "Technical Field" section of this patent, Ryan et al. "relates to highly active supported copper based catalysts. More particularly, [Ryan et al.'s] invention is directed to mechanically stable aluminum oxide supported copper based catalysts useful, e.g., for hydration of nitrites to amides, especially for the hydration of acrylonitrile to acrylamide." This is far removed from the art of making roofing granules.

Further, Ryan et al. is not reasonably pertinent to the problem being solved by the applicants. Again, the Examiner incorrectly states what that problem is, asserting that applicants are concerned with the particular problem of incorporating cuprous oxide into the pores of mineral base particles (Examiner's Action date July 27, 2007, page 6, last paragraph). Again, the Examiner has confused the solution with the problem of addressing the "continuing need for algae-resistant roofing products having algaecide leaching rates that can be controlled . . . ." (specification, page 2, lines 18-20). In contrast, Ryan et al.'s catalysts are "highly active and stable, with high resistance to hydration, copper leaching, and fragmentation" (emphasis added) (col. 14, lines 22-30).

None of the three of the references the Examiner relies upon, Ine et al., Balcar et al. and Ryan et al., is analogous prior art. This rejection should be reversed for this reason.

E. The Cited Combination of References Do Not Make Out a *Prima Facie* Case of Obviousness with Respect to Claims 9-12

As in the case of the first rejection entered under Section 103(a), even if all the art relied upon by the Examiner were actually analogous art, the combination proposed by the Examiner fails to make a *prima facie* case of obviousness. This rejection also relies an inaccurate reading of Balcar et al., namely that sodium silicate is used as a *binder* for glass dust for use in roofing granules (Office Action of July 24, 2007, page 4, second full paragraph).

The addition of Ryan et al. to the five other references cited by the Examiner does not help render the present invention obvious. Ryan et al. teach a process for reducing the leaching of copper from porous aluminum oxide catalysts in comparison with conventional catalysts (col. 20, lines 16-20). It is not clear how Ryan et al. could possibly be combined with Balcar et al., since the two have what appear to be mutually contradictory goals. Balcar et al. seeks to insolubilize heavy metal contaminants in a glassy matrix, while Ryan et al. would like to provide an improved catalyst which permits contact between the catalytic copper metal or metal oxide and the catalysate. Ryan et al. does not suggest that a sodium silicate binder be used for any purpose.

The Examiner has failed to make out a *prima facie* case of obviousness with respect to Claim 9-12, and this rejection should be reversed for this reason.

F. The Examiner Improperly Relies Upon a Machine Translation in the Rejection of Claims 9-12

In making her rejection of Claims 9-12, the Examiner has improperly relied upon a machine translation which incorporates a disclaimer of accuracy, as argued above with respect to the first rejection entered under 35 U.S.C. 103(a) (Examiner's Action dated July 24, 2007, page 5, second paragraph). The rejection should be reversed for this reason as well.

G. The Cited Combination of References Is Improper and Cannot Render Claims 46-50 Obvious

In rejecting Claims 46-50, the Examiner relies upon the combination of Joedicke/Skadulis/McMahon, taken in view of Ine et al., take further in view of Balcar et al., combined with yet another reference, Iwata et al.

As argued above, both Ine et al. and Balcar et al. are non-analogous art. The sixth reference that Examiner has added to try to reconstruct the applicants' invention as claimed in Claims 46-50, Iwata et al., is also non-analogous art. The Examiner does not argue that Iwata et al. is within the same field of endeavor as applicants' invention, but instead contends that Iwata et al. is a secondary reference which shows that the distribution and porosity of granulated powder material may be controlled by the particle size distribution of the granular material, shape of the granules, the amount of binder resin (Examiner's Action mailed July 24, 2007, page 8, fourth paragraph).

Iwata et al. relates to "a friction material" and "[m]ore particularly . . . to a friction material useful for a brake and having good fade resistance and wear resistance" (col. 1, lines 5-9), a field of endeavor unrelated to applicants' presently claimed invention.

The Examiner's characterization of Iwata et al. is not correct.

Iwata et al. is not concerned about the porosity of the granular material as argued by the Examiner. Iwata et al. is concerned about the porosity of the friction material used for brake pads that are made from the granular material (see, e.g. Fig. 1, col. 2, line 58 - col. 3, line 2, Examples 1-11, Tables 3-6). The friction material forms a continuous article (brake pad) and is not itself granulated.

Roofing granules are typically embedded in the upper surface of a bituminous sheet (specification, page 10, lines 15-18), but are not covered with binder. There are no "pores" between the roofing granules. Thus, Iwata et al. is not reasonably related to the particular problem applicants have addressed with their invention.

The Examiner's rejection of Claims 46-50 should be reversed for this reason.

H. The Cited Combination of References Do Not Make Out a *Prima Facie* Case of Obviousness with Respect to Claims 46-50

As in the case of the first and second rejections entered under Section 103(a), even if all the art relied upon by the Examiner were actually analogous art, the combination proposed by the Examiner still fails to make a *prima facie* case of obviousness. This rejection once again relies an erroneous reading of Balcar et al., namely that sodium silicate is used as a binder for glass dust for use in roofing granules (Office Action of July 24, 2007, page 4, second full paragraph).

The addition of Iwata et al. to the five other references cited by the Examiner does not serve to render the present invention obvious. Iwata et al. relates to the production of a friction material for brake pads which bind together an inorganic powder material such as iron oxide, an organic material such as rubber powder, and a fibrous material such as asbestos, with a thermoset resin. Iwata et al. have the goal of forming a dense material with gas permeable micropores, so that gaseous organic decomposition products can leave brake pads heated by the frictional heat of braking to avoid brake fading (col. 2, lines 3-11). Iwata et al. accomplish by forming granules from the powder material and resin binder, and then mixing the granules with secondary materials such as additional binder resin and powder material, and molding and curing the mixture to form the brake pad (Fig. 2). The granules themselves are not intended to be porous. Instead, the porosity is introduced into the friction material (Fig. 1). Thus, none of the references relied upon by the Examiner teach or suggest that roofing granules themselves should be porous.

The cited combination of references thus does not establish a *prima facie* case of obviousness in respect of the presently claimed invention, as claimed by Claims 46-50. There is nothing that discloses or would suggest the presently claimed process to one or

ordinary skill in the art. The Examiner's rejection of claims 46-50 should be reversed by the Board for this reason.

I. The Examiner Improperly Relies Upon a Machine Translation in the Rejection of Claims 46-50

In making her rejection of Claims 46-50, the Examiner has improperly relied upon a machine translation of the Inge et al. reference which incorporates a disclaimer of accuracy, as argued above with respect to the first rejection entered under 35 USC 103(a) (Examiner's Action dated July 24, 2007, page 8, second paragraph). The rejection should be reversed for this reason as well.

VIII. Conclusion

Each of Examiner's rejections under 35 U.S.C. 103(a) should be reversed by the Board because: (1) Even were the Examiner's reasoning correct, each rejection is based on a misunderstanding of the disclosure of Balcar et al., and consequently does not make a *prima facie* case of obviousness; (2) Each rejection is based on a document, the machine translation of a Japanese patent publication, which on its face disclaims its own accuracy; and (3) Each rejection is based on nonanalogous art which should not be considered in testing the nonobviousness of the presently claimed invention under Section 103(a).

Respectfully submitted,

December 12, 2007

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CLAIMS APPENDIX

CLAIMS ON APPEAL:

Claim 4. A process according to claim 39 wherein the mixture is formed into base particles by a forming process selected from press molding, cast molding, injection molding, extrusion, spray granulation, gel casting, pelletizing, compaction and agglomeration.

Claim 5. A process according to claim 39 wherein the at least one inorganic algaecide is provided on the base particle by coating the base particle with the at least one inorganic algaecide.

Claim 7. A process according to claim 39 wherein the at least one inorganic algaecide is selected from the group consisting of copper materials, zinc materials, and mixtures thereof.

Claim 8. A process according to claim 7 wherein the inorganic algaecides are cuprous oxide and zinc oxide.

Claim 9. A process according to claim 40 wherein the at least one inorganic algaecide is provided in the base particles after the base particles are fired, an algaecide-forming compound being dissolved in a fluid to form a solution, the solution being drawn into the pores in the base particles by capillary action to form solution-laden particles, the solution-laden particles being subsequently treated to convert the algaecide-forming compound to an inorganic algaecide.

Claim 10. A process according to claim 9 wherein the algaecide-forming compound is a soluble copper salt, and the solution-laden particles are subsequently treated by heating the particles to convert the soluble copper salt to cuprous oxide.

Claim 11. A process according to claim 40 wherein the at least one inorganic algaecide is provided in the base particles after the base particles are fired, an

algaecide-forming compound being mixed with a binder and a fluid to form a slurry, the slurry being drawn into the pores in the base particles by capillary action to form slurry-laden particles, the slurry-laden particles being subsequently treated to convert the algaecide-forming compound to an inorganic algaecide.

Claim 12. A process according to claim 11 wherein the algaecide-forming compound is a soluble copper salt, and the slurry-laden particles are subsequently treated by heating the particles to convert the soluble copper salt to cuprous oxide.

Claim 13. A process according to claim 39 further comprising coating the algaecide-bearing particles with a colorant composition.

Claim 14. A process according to claim 13 wherein the colorant composition includes a fusible binder, and further comprising heating the colorant-coated algaecide-

Claim 39. A process for producing algae-resistant roofing granules, the process comprising:

(a) preparing porous, inert base particles from a mixture including stone dust and a binder;

(b) providing at least one inorganic algaecide on or within the base particles to form algaecide-bearing particles;

(c) insolubilizing the binder.

Claim 40. A process according to claim 39 wherein the binder comprises an aluminosilicate material, and the base particles are fired in a kiln at a temperature of at least of from 800 degrees C to 1200 degrees C to insolubilize the binder.

Claim 41. A process according to claim 39 wherein the roofing granules have a porosity of between about 3 percent and 30 percent by volume.

Claim 42. A process according to claim 39 wherein the mixture includes from about 10 percent to 40 percent by weight binder.

Claim 43. Roofing granules prepared according to the process of claim 39.

Claim 44. A process for producing algae-resistant roofing granules, the process comprising:

(a) preparing porous, inert base particles from a mixture including stone dust and from about 10 percent to 40 percent by weight of a binder comprising an aluminosilicate material;

(b) providing at least one inorganic algaecide within the base particles to form algaecide-bearing particles;

(c) insolubilizing the binder by firing the base particles in a kiln at a temperature of at least of from 800 degrees C to 1200 degrees C;

the roofing granules having a porosity of between about 3 percent and 30 percent by volume.

Claim 45. Roofing granules prepared according to the process of claim 44.

Claim 46. A process according to claim 39 wherein the porosity of the inert base particles is controlled by selection of the shape of the stone dust.

Claim 47. A process according to claim 39 wherein the porosity of the inert base particles is controlled by selection of the particle size distribution of the stone dust.

Claim 48 A process according to claim 44 wherein the porosity of the inert base particles is controlled by selection of the shape of the stone dust.

Claim 49. A process according to claim 44 wherein the porosity of the inert base particles is controlled by selection of the particle size distribution of the stone dust.

Claim 50. A process according to claim 44 wherein the porosity of the inert base particles is controlled by adjusting the ratio of stone dust and aluminosilicate material.

EVIDENCE APPENDIX

The evidence relied upon by the appellant includes a copy of the machine translation of Japanese Patent Publication No. 2002-018358 relied upon by the Examiner as Exhibit A. This document was introduced into the record by the Examiner by inclusion with the Examiner's Action mailed December 4, 2006.

EVIDENCE APPENDIX

EXHIBIT A

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention performs the wet process which washes a crushed stone in a quarry, a crushed stone field, or a sand production field, it adds calcined lime, a petrifaction system stabilizer, etc. to the crushed stone impalpable powder (dewatering cake) collected from the waste-water-treatment process, carries out churning mixing, granulates, and it relates to the mixed selector of the crushed stone impalpable powder which secures stability while it raises the reinforcement.
[0002]
[Description of the Prior Art] In the quarry, the crushed stone field, or the sand production field, the wet process of washing a crushed stone was carried out, and a lot of crushed stone impalpable powder is generated from the waste-water-treatment process. This crushed stone impalpable powder was the particle of the very fine sandy system of particle size, and for the description [-izing / easily / with storm sewage etc. / description / the shape of mud], it reclaimed land from it as industrial waste, and it was disposed of.
[0003] By the way, as an art of crushed stone impalpable powder which has such description, recently, if carry out amount addition of calcined lime or the lime system stabilizer suitably at crushed stone impalpable powder, and carry out stirring mixing, it **-izes with a mixer, stabilization crushed stone impalpable powder is manufactured and this stabilization crushed stone impalpable powder is mixed with a crusher run (a rock or a ball a crusher a rate under [splendid] crushed stone of an as), or a playback crusher run, it will have become clear that it can use effectively as hydraulic compound subgrade material. And the quality of said granulated stabilization crushed stone impalpable powder is requiring that grain size should suit 95% or more of 5mm screen passage mass percentage.
[0004]
[Problem(s) to be Solved by the Invention] However, when a stabilizer is mixed with crushed stone impalpable powder with a mixer and stabilization crushed stone impalpable powder is manufactured, it is mixed with the granular object of the grain size in predetermined, and a massive object with a big lump -- the thing adhering to a mixing chamber wall is shaved off just before blowdown -- may be discharged. Although this unnecessary massive object will be removed with the screen equipment of degree process etc., when there are many amounts removed, there is a problem that the effective utilization factor of an aggregate resource worsens.
[0005] Let it be a technical problem for this invention to offer the mixed selector of the crushed stone impalpable powder which is an easy equipment configuration, can perform crushed stone impalpable powder, mixing of a stabilizer, and crack sorting in view of the above-mentioned point, and can manufacture many granular objects of the grain size in predetermined as much as possible.
[0006]
[Means for Solving the Problem] If this invention is in the mixed selector of crushed stone impalpable powder according to claim 1 in order to solve the above-mentioned technical problem While having the mixer which mixes and granulates crushed stone impalpable powder and a stabilizer and equipping the

low order of this mixer with the vibration screen which sifts out the granular object of the grain size in predetermined It is characterized by equipping the blowdown side of this vibration screen with a stroke means to add and crack a stroke in the massive object which does not pass a mesh using the oscillation of a vibration screen.
[0007] Moreover, if it is in the mixed selector of crushed stone impalpable powder according to claim 2, as said stroke means, the end side of a flexible plate is fixed to the blowdown side of a vibration screen, the free end by the side of the other end is almost carried on a sieve mesh, and it is characterized by considering as the configuration cracked by the stroke of the flexible plate which vibrates while the massive object which does not pass a mesh passes through between a flexible plate and sieve meshes.
[0008]
[Embodiment of the Invention] According to the mixed selector of the crushed stone impalpable powder of this invention according to claim 1, if amount addition of calcined lime, the lime system stabilizer, etc. is carried out suitably and stirring mixing is carried out within a mixer at crushed stone impalpable powder, crushed stone impalpable powder will be dehydrated by the stabilizer, and if it becomes massive gradually and agitates further, it is cracked by the mixed wing and granulates soon. If mixture is discharged to a low-ranking vibration screen after predetermined time mixing with a mixer, while mixture flows down along with the sieve mesh of a vibration screen, the granular object in a great portion of predetermined grain size passes the mesh of a sieve mesh, and is sorted out. And what the massive object with a large grain size could add the impact, was cracked by stroke means to vibrate with the oscillation of a vibration screen if it flows down without passing a mesh and arrives at the place of a stroke means soon, and was cracked finely passes a mesh, and sorting clearance of a massive object, ****, etc. which fell and remained, without being cracked is carried out as a massive object besides predetermined grain size.
[0009] thus -- while carrying out churning mixing of crushed stone impalpable powder and the stabilizer, and adding a stroke in a vibration screen even if a massive big thing is discharged together, without being cracked well in case granulation processing is carried out -- **** -- many sorting recovery of the granular object in predetermined grain size can be carried out as much as possible by things.
[0010] Moreover, since according to the mixed selector of the crushed stone impalpable powder of this invention according to claim 2 the end side of a flexible plate is fixed to the blowdown side of a vibration screen and the free end by the side of the other end was almost carried on the sieve mesh as a stroke means The flexible plate is moving so that a sieve mesh may be hit by the oscillation of a vibration screen, the massive object which does not pass a sieve mesh is also cracked to some extent by the stroke of a flexible plate, and sorting recovery of it is carried out as a granular object of the grain size in predetermined. It is easy, and the configuration of this stroke means is also cheap, and it is effective.
[of a configuration]
[0011]
[Example] Hereafter, the example of this invention is explained based on a drawing.
[0012] One in drawing is the mixed selector of the crushed stone impalpable powder which adds crushed stone impalpable powder and a stabilizer, mixes, and is granulated, carries the mixer 3 which carries out granulation of the crushed stone impalpable powder on a stand 2, and is arranging in the low order of this mixer 3 the vibration screen 4 which carries out crack sorting. In addition, although not illustrated, storage of crushed stone impalpable powder and a stabilizer, a measuring tub, etc. are suitably arranged in the high order of a mixer 3.
[0013] It supports free [a revolution] by the bearing 7 which penetrated two parallel mixed shafts 6 and 6' to the mixing chamber 5, and was fixed to it as said mixer 3 at the mixing chamber 5, for example, and the tandem-drum-arrangement mixer rotated in the direction of repulsion which shows the mixed shaft 6 and 6' by the arrow head of drawing 2 by the motor 8 for actuation is adopted. While arranging arms 9 and 10 in said mixed shaft 6 and 6' at a radial, the scraping wing 12 which bears the operation which scratches the ingredient which adhered the grinding crushing wing 11 which bears the operation which grinds and crushes a massive object at the head of an arm 10 again at the mixing chamber 5 is arranged at the head of an arm 9.

[0014] Said grinding crushing wing 11 serves as a configuration which bites the massive object which is going to grind against the clearance between the walls of a mixing chamber 5, and it is going to crush, and is strongly forced to a wall. Moreover, the scraping wing 12 While scratching the ingredient which ground, was crushed by the grinding crushing wing 11, and adhered to the wall of a mixing chamber 5 It is the configuration which can send out the scratched ingredient in the mixed shaft 6 and the direction of an axial center of 6', and is made the granular object which can reuse crushed stone impalpable powder by grinding by both this wing and repeating a crushing operation and a scraping operation repeatedly.
[0015] The lower part of a mixing chamber 5 is equipped with the gate 13 which opens and blockades an exhaust port, and this gate 13 is made to slide by the air cylinder 14, is opened and closed optimum dose every, and enables it to discharge mixture gradually. Moreover, the advice hopper 15 which shows the mixture discharged to a vibration screen 4 is arranged in the low order of a mixing chamber 5. In addition, a mixer 3 is not limited to the tandem-drum-arrangement mixer of the above structures, in short, mixes crushed stone impalpable powder and a stabilizer, and just corns them suitably.
[0016] Suitably, a vibration screen 4 made the low order of a mixing chamber 5 incline through installation and a spring 19 in a location, and has hung the vibrating motor 18 in it while it arranges the sieve mesh 17 which has a predetermined mesh in a frame 16. And while making it flow down, vibrating the thrown-in mixture, the granular object which passed the sieve and the mesh is dropped on the conveyance conveyer 21 through the advice chute 20, and are collected, and he is trying to discharge as discard the massive object which does not pass a mesh out of a system through the oversize discharge charge 22. In addition, although the mesh of a sieve mesh 17 should just adopt the thing of proper size if needed, if an about 6mm thing is adopted, for example, a granular object suitable as subgrade material will be obtained.
[0017] Moreover, the stroke means 23 for adding a stroke to the massive object which does not pass a mesh using the oscillation of a vibration screen 4, and cracking finely is arranged in the blowdown side of the sieve mesh 17 of a vibration screen 4. The flexible plates 24, such as a rubber plate suitably made into die length as this stroke means 23 by the sieve mesh 17 as shown, for example in drawing 1 and drawing 3 , and ******, are used, it fixes with a conclusion implement to the supporter material 25 which built the frame 16 over this end side, and the free end by the side of the other end is almost carried on a sieve mesh 17. The thing of weight is employable suitably, or this flexible plate 24 attaches a spring and weight, and enables it to demonstrate proper striking power so that it may vibrate up and down with the oscillation of a vibration screen 4 and the stroke crack of the massive object on a sieve mesh 17 can be carried out. Thus, if the flexible plate 24 is adopted as a stroke means, a configuration is easy and cheap, and although what cannot be cracked [****] is inserted, since it is convenient, it is convenient.
[0018] When carrying out churning mixing of crushed stone impalpable powder and the stabilizer and manufacturing stabilization crushed stone impalpable powder with the mixed selector 1, while carrying out a deer, paying crushed stone impalpable powder out of the crushed stone impalpable powder storage tank which is not illustrated first and carrying out specified quantity measuring in a measuring tub, a stabilizer is paid out of a stabilizer storage tank, what carried out specified quantity measuring and was these-measured in the measuring tub is supplied to a mixing chamber 5, and churning mixing is carried out. If churning mixing of the crushed stone impalpable powder is carried out with a stabilizer, it will become a massive object gradually, dehydrating, and this massive object repeats repeatedly scraping by grinding crushing and the scraping wing 12 which are ground and are twisted crushing wing 11, receives it, is cracked finely, and is granulated soon. If crushed stone impalpable powder is granulated in general, by the air cylinder 14, the gate 13 of the mixing chamber 5 lower part is opened gradually, and is discharged to the optimum dose [every] vibration screen 4.
[0019] While the mixture thrown into the vibration screen 4 flows down with the screen crack by oscillation, most things pass the mesh of a sieve mesh 17, and fall. The massive object which does not pass a mesh flows down on a sieve mesh 17 as it is, and arrives at the place of the stroke means 23.
[0020] If the clearance between the flexible plates 24 and sieve meshes 17 whose massive object is the stroke means 23 is entered, a massive object is hit by the flexible plate 24 danced up and down by

oscillation, and is cracked gradually. In this way, what was cracked while passing the flexible plate 24, and became small [grain size] passes the mesh of a sieve mesh 17, falls, through the advice chute 20, is discharged on the conveyance conveyer 21 and collected. Moreover, **** which remained without being cracked is discharged out of a system as discard through the oversize discharge charge 22 to predetermined grain size.

[0021] Thus, in the mixed selector 1 of the above-mentioned crushed stone impalpable powder, when the mixed crack of crushed stone impalpable powder and the stabilizer is carried out and granulation processing is carried out with a mixer 3, even if a still massive thing is discharged without being cracked well, it cracks with the stroke means 23 with which the vibration screen 4 was equipped, and many granular objects in predetermined grain size can be collected as much as possible.

[0022]

[Effect of the Invention] While having the mixer which mixes and granulates crushed stone impalpable powder and a stabilizer and equipping the low order of this mixer with the vibration screen which sifts out the granular object of the grain size in predetermined according to the mixed selector of the crushed stone impalpable powder of this invention according to claim 1 as mentioned above Since the blowdown side of this vibration screen was equipped with a stroke means to add and crack a stroke in the massive object which does not pass a mesh using the oscillation of a vibration screen, by the easy equipment configuration, crushed stone impalpable powder, mixing of a stabilizer, and crack sorting can be performed, and many granular objects of the grain size in predetermined can be manufactured as much as possible.

[0023] According to the mixed selector of crushed stone impalpable powder according to claim 2, moreover, as a stroke means Since it considered as the configuration cracked by the stroke of the flexible plate which vibrates while the massive object which fixes the end side of a flexible plate to the blowdown side of a vibration screen, carries the free end by the side of the other end almost on a sieve mesh, and does not pass a mesh passes through between a flexible plate and sieve meshes As a stroke means, it is easy, and a configuration is also cheap and effective.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a Court or the Board regarding any related appeals or interferences.